UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/614,511	07/11/00	ANDREONI W	CH-1999-0004

IM22/0629

FERENCE & ASSOCIATES
129 OAKHURST ROAD
PITTSBURGH PA 15215

EXAMINER	
XU, L	
ART UNIT	PAPER NUMBER
1774	3

DATE MAILED: 06/29/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No.	Applicant(s)	
	09/614,511	ANDREONI ET AL.	
	Examiner	Art Unit	
	Ling Xu	1774	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 July 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 July 2000* is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
18) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other:

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. The claimed subject matter is a compound substituted in the 3- or 4-position of the base unit with electron-donor group and substituted in the 5-position of the base unit with electron-acceptor or p-delocalizing group. The Figure 1 shows only the base unit of the compound. Therefore, the substituents of the claimed compound in the 3- or 4- and 5- position of the base unit must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Claim Objections

2. Claim 5 is objected to because of the following informalities:

There are two claims 5 in this application. The second claim 5 should be changed to claim 6. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-7 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, it states "a compound as shown in Figure1", however, Figure 1 shows only the base unit, not the claimed compound. The claimed compound includes base unit substituted in 3- or 4- position with electron-donor group and in 5-position with electron-acceptor or p-delocalizing group.

In claim 2, line 2, it is confusing if R2 in NR2 is another group different from R, R' and R" or two Rs in the formula. The Examiner suggests R2 be changed to R_2. Similarly, same changes should also be applied to the formulas in the specification and claims where numeric numbers are use to indicate the number of the atom in the formulas.

In the second claim 5 (should be corrected to claim 6), line 2, the R in "-OR" is not defined.

Claim 10 recites the limitation "The compound" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang et al. (US 4,885,211) in view of Moore et al. (US 5,484,922).

Tang discloses that an EL device comprises an anode, an organic luminescent medium with at least two separate organic layers, and a cathode (Col. 4, lines 44-50). The organic luminescent medium contains at least two separate organic layers, such as hole transporting zone and electron transporting zone(Col. 10, lines 48-67). Tang also discloses that the organic electron transporting zone contains tris(8-quinolinol)aluminum Alq_3 (Col. 16, lines 1-45) as luminescent materials. The electron transporting zone also functions as luminescent layer.

Tang does not disclose that Alq_3 is substituted in 3- or 4- position with electron-donor group and in 5-positions simultaneously with an electron-acceptor or p–delocalizing group.

Moore teaches the use of substituted aluminum chelate compound in an EL device (Col.5, lines 45-67). The substitutes may be made in all six positions including 3-, 4- and 5-positions of the quinoline ring [Col. 5, formula (III)].

Moore also teaches that substituents on the 8-quinolinolato rings can also perform useful hue shifting functions. The quinoline ring consists of fused benzo and pyridino rings. When the pyridino ring component of the quinoline ring (2, 3, and 4 positions of the quinoline ring) is substituted with one or more electron donating substituents the effect is to shift the hue of emission to lower wavelength (Col. 6, lines 59-67). When any or all the benzo ring components of the quinoline ring (5,6,and 7 positions of quinoline ring) is substituted with electron accepting substituents the effect

is to shift the hue of emission to shorter wavelengths (Col. 7, lines 10-20). Moore lists the possible substituents as electron donating and accepting substituents, such as –CH_3, -CF_3, -CH, -OCH_3, -OC_2H_5 (Col. 7-10).

Therefore, it would have been obvious to one of the ordinary skill in the art to use Alq_3 substituted in 3 or 4 and 5-positions with certain electron donating or accepting groups in order to obtain hue of emission to a lower wavelength, as suggested by Moore.

Moore does not list all claimed substitutes, such as $CF=CF_2$, however, Moore lists substitutes that have same or similar structure as the claimed substitutes, such as hydrogen, hydrocarbon groups contain 1-10 carbon atoms, amino, cyano, halogen, and a-haloalkyl substituents, etc. (Col. 5, lines 60-67). Moore also specifies the possible substituents as electron donating and accepting substituents, such as –CH_3, -CF_3, -CH, -OCH_3, -OC_2H_5, $CH=CCl_2$ (Col. 7-10).

Although, in the specification, it states "the organic light-emitting layer consists of Alq_3 derivatives having a larger intrinsic luminescence yield with a calculated enhancement factor up to four, the device will have a larger quantum efficiency than any other device made by unsubstituted and updoped Alq_3 (page 8 of the specification), there is no evidence, such as examples or data, in the specification support such statement.

Therefore, absence ~~of~~ to 9 showing unexpected results, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the claimed substituted Alq_3 compound for Tang's and Moore' EL device, because Tang and Moore

disclose the use of Alq_3 compound substituted with same or similar groups. Specifically, Moore lists substitutes that have same or similar structure as the claimed substitutes. One skilled in the art would have been motivated to use the compound with expectation that similar compound in structure will have similar properties and same utilities.

5. Claims 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang et al and Moore et al. as applied to claims 1-14 above, and further in view of applicants' admission.

As stated above, Tang and Moore disclose the use of substituted Alq_3 in an EL device.

Tang and Moore disclose a two-layer structure wherein an electron transporting layer having both light emitting properties and electron transporting properties. Tang and Moore do not disclose that the EL device has a luminescent layer in addition to the hole injecting/transporting zone and an electron injecting/transporting zone. However, it is well known in the art that an EL device having a three-layer DH structure and two-layer SH-A and SH-B structures, depends on where the emissive layer is positioned. It is also supported by Applicants' statement in the Specification (Page 8, lines 4-10) that the organic EL device could have two or three layers structure in addition to the electrodes. Both three-layer and two-layer EL device have the same functions including hole injecting/transporting, light emitting, and electron injecting/transporting. In the two-layer structure, one layer may function more than one functions, such as hole injecting/ transporting and light emitting (SH-A) or light emitting and electron injecting/

transporting (SH-B) to obtain the same electroluminescent effects as the three-layer (DH).

Therefore, it would have been obvious to one of the ordinary skill in the art at the time the invention was made to add a separate light emitting layer or to make a three-layer structure to Tang's and Moore's EL device since it is well known in the art that an EL device can have either two- or three-layer structure depends on where the light emitting layer or zone is positioned, and it is also supported by applicants' disclosure.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling Xu whose telephone number is 703-305-0395. The examiner can normally be reached on 8:00 - 4:30 Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on 703-308-0449. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-5409 for regular communications and 703-305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

CYNTHIA H. KELLY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

lx

June 25, 2001